Pioneering Secure Window Technology in Banknote Paper

By Dr Friedrich Kretschmar, Louisenthal

The development of windows in paper – either through apertures overlaid with foil or super-wide window threads – has been spearheaded by a number of leading papermakers.

So the new €20 is not the first paper note to include a window (see page 1). But it is certainly the most ambitious to date, and was the result of years of development by a number of leading companies in currency production, among them KBA-NotaSys, Kurz, seven qualified euro printers and four papermakers (FNMT, Banque de France, Fabriano and Louisenthal). FNMT's work on its contribution to this development was described in detail in the October issue of Currency News. In this article, Friedrich Kretschmar of Louisenthal – pioneers of the aperture/foil overlay approach – charts some of the developments that have led to the adoption of this new feature.

The race to stay ahead of the counterfeiter shows no signs of abating. Visual features are the community's first line of defence, and it's critical to retain, upgrade and enhance the already well-known community features, including watermarks, intaglio portraits and threads.

With the introduction of polymer notes in 1988, the clear window was introduced to challenge the efforts of casual counterfeiters. But the clear window is not perceived by all to be a secure feature in its own right. It has had to evolve over the decades and become adaptable for various substrates. What started as an unprinted, clear portion of a banknote has now progressed forward toward a dynamic and secure solution, as some of the following developments show.

Interest in windows gains momentum

The ECB issued its first series (ES1) in 2002 – with foil stripes for the lower denominations and foil patches for the higher denominations. This created an enormous demand for foil production in the industry. With this experience in mind, what do we learn from the recently issued €20 banknote, which is a technological leap forward?

Some ten years ago, ECB started to look for features for the new ES2 series – some evolutionary, some radical. As a prerequisite, each of these features would need to protect ES2 by successfully passing a validation process, including industrial production conditions and circulation evaluation, as well as challenging anti-counterfeit analysis.

As we know today, among these features tested, a new approach was presented to ECB comprising a paper window with complex content to challenge counterfeiters.

For such a feature to be successful, it had to be validated not only for the foil, requiring a complex set-up, to impose a counterfeit barrier, but also a carrier concept for a secure window in paper, which would allow for standard banknote production (ie. printing steps like offset, silkscreen, intaglio, numbering and finishing).

Even the challenge to supply paper in stable piles to ensure efficient printing has been solved on an industrial scale. For the typical volumes ECB needs for issuing – billions, not millions – this second challenge had to be overcome! For the industry, this means that there is not only an industrialised carrier system for secure windows available, but also sufficient production capacity.

We have learned, with the introduction of the secure window, that the ECB has not only established a safe carrier system for secure windows in paper, but most importantly has also optimised the secure window content as security against counterfeiting.

So for the first challenge – to efficiently embed window content into a lamination foil – this is good news. The proof that such complex foil can be produced in massive volumes is the second good news.

G&D and Louisenthal secure window developments

Louisenthal and G&D have progressed window technology for paper notes for over a decade, and since 2005 have introduced several banknotes with secure windows.

Varifeye®, for example, was first introduced in the Bulgarian 20 leva in 2005. It is an innovative feature designed for easy public recognition, and can be easily verified by holding it against a dark surface (compared to light surface or holding it up to the light), where its distinctive pattern change becomes apparent.

Varifeye combines a window with a security overlay foil incorporating a colour and pattern shift through the use of liquid crystal technology. This provides three different optically variable effects depending on the viewing angle and whether the feature is observed in transmitted or reflected light. For the 20 leva, the pattern switch alternates between the numerals 20, and a series of diagonal stripes.

Bulgaria 20 leva.

This technology has been adopted in several banknotes over the years, and has featured in banknotes in Latvia, UAE, Mongolia, Oman and this year in Iraq. The new series of Oman rials, for example, which were upgraded from transfer foil to foils including Varifeye and holographics, are particularly noticeable for their beautiful designs.

Oman 20 rials.

Outlook for the future

We have seen that windows in paper can be secure, attractive and easy to authenticate. So we can expect other window features to surf on this new wave emerging from foil features.

With the achievements in proven industrialisation and production capacity, we look forward to new secure window breakthroughs into the future.